

NOTE

A Note on the Occurrence of the Lone Star Tick, *Amblyomma americanum* (Acari: Ixodidae), in the Maryland Suburban Counties Near Baltimore and Washington, D.C.

The lone star tick, *Amblyomma americanum* (L.), occurs over much of the southeastern and central U. S., with an extension attenuating northward along the Atlantic Coast (Keirans and Durden 1998). Over the past 20 years, the black-legged tick, *Ixodes scapularis* Say, has largely supplanted the American dog tick, *Dermacentor variabilis* (Say), as the principal tick species causing concern among the public and health care professionals in central Maryland. Like *I. scapularis*, *A. americanum* has been extending its range and experiencing increased population densities (Ginsberg et al. 1991, Ginsberg and Zhioua 1996, Means and White 1997). Lone star ticks are not involved in transmission of the Lyme disease pathogen, *Borrelia burgdorferi*, and therefore have received less publicity than *I. scapularis*. Recently, however, Childs and Paddock (2003) pointed out a significant rise of *A. americanum* as a public health problem, and anticipated a continued increase in cases of human disease caused by *A. americanum*-associated pathogens (*Ehrlichia chaffeensis*, *E. ewingi*, “*Borrelia lonestari*”). Having been familiar with *D. variabilis*, in which only adults bite large mammals, many central Maryland residents remain naïve about the possibility of being bitten by the small larvae and nymphs of *A. americanum* and *I. scapularis*. Described here are the results of a survey for *A. americanum* in the suburbanized areas surrounding Baltimore and Washington, District of Columbia (D. C.), where suitable habitat and hosts for this species exist amidst a large human population. The survey

findings are combined with collection data from the past 20 years to better define the distribution of *A. americanum* in the area. The phenology of *A. americanum* in south-central Maryland is also described.

In 2002, eight state and municipal parks, a watershed area and the western campus of the USDA, ARS, Beltsville Agricultural Research Center (BARC) in Maryland were sampled for host-seeking ticks by flagging (Table 1). These sites were suspected to straddle the western edge of the range of *A. americanum* in Maryland. A 0.5 by 0.5 m flag of laminated flannel crib cloth was flip-flopped on leaf litter and low vegetation, as the operator walked slowly for 30 s, advancing  $\approx 10$  m, in a straight line, as obstructions allowed. Ten such subsamples were taken at 5–7 sites at each location. Larval and nymphal ticks were removed from flag cloths on pieces of transparent tape and affixed in notebooks, and the ticks identified under a dissecting microscope in the laboratory. Three 600–700 m routes on the eastern campus of BARC were flagged 2–4 times per month during 1999–2001 to define seasonal activity periods of host-seeking ticks.

Lone star ticks were found at the BARC-West Campus and three of the nine park and watershed areas sampled in 2002 (two areas were sampled in the elongate Gunpowder Falls State Park) (Fig. 1). Two of the locations, where *A. americanum* was found were in easternmost Montgomery County, near the border of Prince George’s County. The third location was in southeastern Balti-

Table 1. Locations in Maryland sampled for *A. americanum* by flagging in 2002.

Locality	<i>A. americanum</i> found
Baltimore County	
Gunpowder Falls State Park – Germantown	–
Gunpowder Falls State Park – Chase	+
Howard County	
Patapsco Valley State Park – Ellicott City	–
Montgomery County	
Blockhouse Point Park	–
Fairland Regional Park	+
Rock Creek Regional Park – Lake Needwood	–
Paint Branch Park	+
Wheaton Regional Park	–
Prince George's County	
T. Howard Duckett Watershed (Rocky Gorge Reservoir) – Supplee Area	–
BARC-West Campus	+

more County, where Gunpowder Falls State Park fronts the Chesapeake Bay. In the 1980s, the author found a well-established population of *A. americanum* at Cedarville State Forest in southern Prince George's County, but rarely captured the species by dragging at BARC and the USGS Patuxent Wildlife Research Center in the northern part of the county. No *A. americanum* were found in extensive drag sampling in Montgomery County in the mid-late 1980s (Carroll and Schmidtman 1986, Carroll et al. 1991). However, by 1994, a substantial population of *A. americanum* was found at NASA Goddard Space Flight Center, Greenbelt, a property adjoining the BARC-East campus, where *A. americanum* was no longer scarce. In Harford County, populations of *A. americanum* occur at the Aberdeen Proving Ground and Edgewood Arsenal along the Chesapeake Bay. Repeated flag sampling associated with the USDA Northeast Tick Control Project (1998–2003) revealed that *A. americanum* was

widespread at USGS Patuxent Wildlife Research Center North Tract, Downs Park and Gibson Island in Anne Arundel County (Carroll et al. 2002). In sampling for the Northeast Tick Control Project at Loch Raven Reservoir, an impoundment of Gunpowder Falls connected by riparian forest with Gunpowder Falls State Park, no *A. americanum* were captured, although there were dense populations of white-tailed deer, *Odocoileus virginianus* (Zimmermann), the principal host of *A. americanum* (Carroll et al. 2002).

The distribution of *A. americanum* in Maryland corresponds closely to the Coastal Plain (Fig. 1). The Baltimore-Washington, D. C. Corridor appears to be in the vanguard of western expansion of *A. americanum* in Maryland. Although *A. americanum* was not found at sampling sites in central and western Montgomery County, Howard County, and the more inland sites in Baltimore County, localized populations could exist in those areas, isolated from the more continuously distributed Coastal Plain populations. Prince George's and Anne Arundel County sites in the Northeast Tick Control Project that did not receive control treatments showed increased *A. americanum* density from 1998–2003 (Carroll et al. 2002).

In south-central Maryland, host-seeking adult *A. americanum* were found from March (warm days) to July, with a peak in June. Host-seeking nymphs occurred with adults, but the activity season began later, early May, and lasted longer into July. Nymphal activity peaked in June. Larval clusters were occasionally encountered in early June, but the great majority of larval host-seeking took place from late July to early September. These activity periods resemble those reported for coastal and Piedmont Virginia (Sonenshine and Levy 1971) and to a lesser extent Arkansas (Patrick and Hair 1977), where the

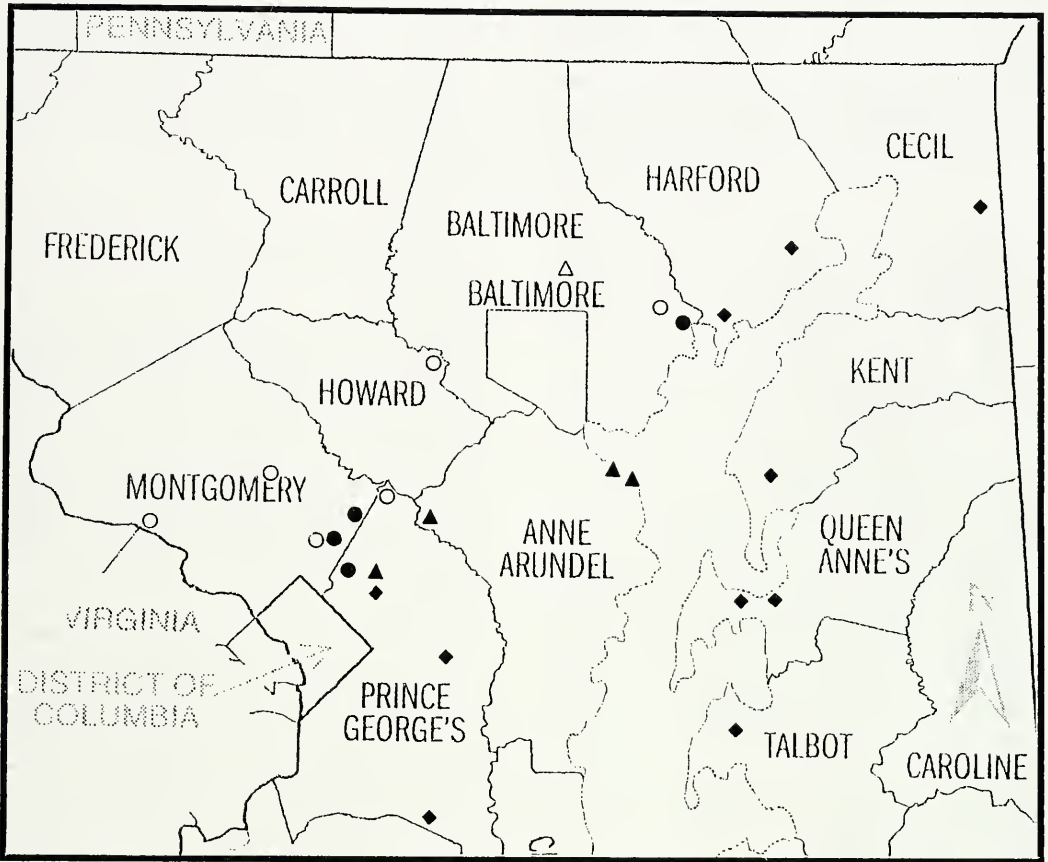


Fig. 1. The distribution of *A. americanum* in central Maryland corresponds closely with the Coastal Plain. Solid symbols indicate locations where *A. americanum* was found. Circles indicate parks and BARC West campus sampled in 2002. Triangles indicate sites extensively sampled 1998–2003 for USDA Northeast Tick Control Project. Diamonds indicate sites where *A. americanum* was captured by flagging during the course of other studies 1993–1997. The Chesapeake Bay is the large unlabeled body of water slightly to right of center of the map. *Amblyomma americanum* is widespread on Maryland’s Eastern Shore, those counties on the Delmarva Peninsula on the right side of the map.

nymphal activity season is longer. In Georgia, drag collections showed longer activity periods for all host-seeking stages and earlier peaks (Davidson et al. 1994) than observed in Maryland. However, CO<sub>2</sub> sampling in Georgia by Davidson et al. (1994) showed much earlier *A. americanum* activity for adults and nymphs (largest catches in March) than drag sampling.

As in the case of *I. scapularis*, the growth and spread of *A. americanum* populations can be attributed to the enormous increase in white-tailed deer

numbers in the past half century. Means and White (1997) suggested that repopulation of many areas of the northeast by wild turkeys, *Meleagris gallopavo* L., suitable hosts for immature *A. americanum*, has facilitated the spread of these ticks. Transportation of horses to farms in Maryland may also contribute to colonization by *A. americanum*. The author had an opportunity to examine a horse heavily infested with *A. americanum* that had been brought into Montgomery County from Virginia the previous day.



The combination of factors (especially deer and forested habitats) that have allowed the blacklegged tick to become a major problem in suburban areas in the northeastern U. S., including Maryland, exists in the Baltimore-Washington Corridor and favors the spread and establishment of *A. americanum* populations. Although the present distribution of lone star ticks in Maryland corresponds closely to the Coastal Plain, the spread of *A. americanum* into interior New York State, with its upland physiography and cooler climate (Means and White 1997), portends a westward expansion of the range of *A. americanum* into the Piedmont in Maryland. Residents and health care professionals will need to be more aware of *A. americanum* and the symptoms of diseases caused by pathogens it can transmit. The northward and westward spread of *A. americanum* in the northeastern U. S. is consistent with the current trend of climatic warming allowing species with southern origins to occupy previously inhospitable areas.

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